

MONTANA LAND INFORMATION GRANT APPLICATION

STATE FISCAL YEAR 2019

BLACKFEET RESERVATION, MT
HEART BUTTE CORS PROJECT

FEBRUARY 15, 2018

TRIBAL TRANSPORTATION

BROWNING, MT 59417

Fiscal Year 2019 Montana Land Information Act Grant Application

Blackfeet Reservation, Montana

APPLICATION FOR MLIA GRANT FUNDING

SECTION 1 – APPLICANT, PARTNER, AND PROPOSAL INFORMATION

Primary Applicant Contact Information <i>(Please fill this section out in it entirety)</i>	
Name of Agency/Entity:	Blackfeet Nation
Department:	Transportation Planning
Division/Section:	Transportation
Street:	All Chiefs Road
City:	Browning
County:	Glacier
State:	MT
Zip Code:	59417
Project Manager Contact Information:	
Name:	Don White
Title:	Transportation Director
Email Address:	donywhite@yahoo.com
Phone Number:	406.338.7445
Fax Number:	406.338.7117
Secondary Contact Information:	
Name:	Toni Grant
Title:	Assistant Transportation Director
Email Address	Granttoni@yahoo.com-
Phone Number:	406.338.7445
MLIA Grant Funding Request & Match:	
Total Requested MLIA Funds:	\$18,066
Total Matched Funds:	\$9,743

Fiscal Year 2019 Montana Land Information Act Grant Application

Blackfeet Reservation, Montana

Proposal Information	
Date Submitted:	2-15-18
Identified Grant Priority:	Improve Land Records
Annual or Multi-Year Proposal:	Annual
Proposal Prepared By:	Blackfeet Nation
Short Title of Proposal:	Blackfeet Nation – Heart Butte CORS Purchase & Installation
<p>Executive Summary (<i>required – 250 maximum word count</i>):</p> <p>The Blackfeet Nation proposes to purchase and install a Continuously Operating Reference Station (CORS) in Heart Butte, Montana to serve as high accuracy georeferenced survey control to support mapping activities on the Blackfeet Reservation. The National Geodetic Survey (NGS) no longer accepts passive survey control points; NGS now uses CORS. CORS establishment will improve the quality and production of survey grade GPS data.</p> <p>The Tribe proposes that the CORS hardware be purchased with MLIAC funding, installed by the Blackfeet Housing Department, with additional labor from the Blackfeet Transportation Program, and internet, electricity, and site security provided via the Heart Butte School or other suitable facility.</p> <p>The Blackfeet Tribe has previously installed an NGS CORS in Browning and has proficiently utilized the facility to collect PLSS data for that area. In cooperation with MDT, the Tribe will install NGS CORS in Cut Bank and Pendroy in 2018. The proposed Heart Butte CORS will serve as infill to the three NGS CORS to provide the densification needed to establish a Real Time Network (RTN). The proposed Heart Butte CORS station will provide survey control to collect and map sections corners, utilities, and other land attributes in a common, georeferenced coordinate system.</p>	
List All Past Awarded MLIA Grants:	
None	

Fiscal Year 2019 Montana Land Information Act Grant Application

Blackfeet Reservation, Montana

Funding Partners: <i>(required for each partner, copy box as needed)</i>	
Name of Contact:	Chancy Kittson
Name of Agency:	Blackfeet Housing
Street:	1200 SW Boundary Road
City:	Browning
County:	Glacier
State:	MT
Zip Code:	59417
Contact Email Address:	chancy@blackfeethousing.org
Contact Phone Number:	(406) 338-5031

SECTION 2 – RELEVANCE

Improve Land Records

Installation of the Heart Butte CORS will provide control for 450 square miles and near the southern border of the Blackfeet Reservation, eliminating surveys based on local control systems that do not georeference Montana's PLSS system. The permanent CORS will be publicly accessible and will serve as an invaluable tool to efficiently locate PLSS monumentation for incorporation into a Tribal GIS system and the MSDI.

The Blackfeet Reservation has sparse mapping control availability, with some areas as large as 200 mi² with no Montana Spatial Data Infrastructure recognized mapping controls. The Montana Land Information Plan FY 2019 prioritizes the improvement of land records under "Improve Land Records: a. Improvements to digital representation of Public Land Survey System for improving accuracy of MSDI Cadastral and Administrative Boundaries Themes: i. Collecting new survey control data". Efficiently surveyed section corners will contribute value locally and statewide by improving the MSDI Mapping Control theme, aiding in the development of other Montana Land Plan priorities:

- Public Safety Answering Point boundaries
- Disaster and Emergency Management Planning
- Land Use Planning
- Infrastructure and Asset Management

The project will also compliment the GIS of Pondera and Glacier Counties, by improving the efficiency of surveying in the region.

SECTION 3 – PUBLIC BENEFIT

The Blackfeet Nation of the Blackfeet Reservation is applying for funding to purchase and mount a Continuously Operating Reference System (CORS). The Tribe will utilize the CORS to collect mapping control as part of joint hands on training program with Blackfeet Community College to collect new mapping control points to contribute to the MSDI. The National Geodetic Survey (NGS) no longer accepts passive survey control points. NGS now uses Continuously Operating References Systems (CORS). CORS establishment will improve the quality and production of survey grade GPS data for the following purposes:

- Geospatial Data Collaboration - Survey data collected referencing CORS can be uploaded to GIS systems to show spatial relationships and increase data accessibility. Efficiently surveyed section corners and parcel boundaries will contribute value statewide and locally by improving the MSDI Mapping Control theme, aiding in the development of
- Public Safety Answering Point boundaries
- Disaster and Emergency Management Planning
- Land Use Planning
- Infrastructure and Asset Management
- Quality GIS Foundation for the Blackfeet Nation
- Other Applications - Improved geodetic control and accessibility will assist all tribal spatial information users, as documented by the previously referenced publications.

Additional applications include:

- Agriculture
- Precise grading
- Chemical application
- Irrigation
- Environmental
- Groundwater monitoring
- Wetland delineation and mapping
- Geophysical measurements

In addition to the improvements to land information, the project will serve as a valuable training opportunity for the students of Blackfeet Community College, introducing the next generation of land information stewards to surveying, and data collection.

SECTION 4 – PROJECT MANAGEMENT AND ORGANIZATIONAL CAPABILITY



Figure 1 - Don White demonstrating the Browning CORS located at Glacier Family Foods Grocery Store.

The Blackfeet Tribe, through Project Manager Don White, has pioneered mapping and surveying technology projects on the Blackfeet Reservation, including installation of CORS. The following demonstrates the Blackfeet Tribal Transportation Program's project management experience and qualifications:

1. Mapping and Survey Technology – In 2008, the Blackfeet Nation, together with other Rocky Mountain tribes, began their eight phase Tribal Mapping endeavor, which included the following efforts:

a. **Development of Low Distortion Projections** to reduce distortion associated with using the State Plane Coordinate System and reduction in resurveys/errors associated with using the Modified State Plane Coordinate System. Tribal projections, including the Blackfeet projection, can be found in ESRI 10.4.1 and newer.

b. **Publication of a Tribal Coordinate Reference System Handbook** to assist surveyors and GIS professionals in the implementation of the Low Distortion Projections.

c. **CORS and RTN Establishment** – As described below and throughout this application, the Tribes have and are currently implementing this technology. The Tribe has begun partnering with Washington State to implement an RTN network.

d. **LiDAR and Orthorectified Photogrammetry** – In 2014, the Blackfeet obtained LiDAR and orthorectified photogrammetry for 9 square miles in the Browning area and the Tribe intends to acquire LiDAR for the remainder of the reservation in 2019. The Blackfeet have begun scoping and defining partners for obtaining LiDAR and orthorectified photogrammetry throughout the reservation.

e. **Collect and Compile GIS Based PLSS and Infrastructure Data** – As a result of previous mapping project efforts, the Tribe will be able to efficiently collect survey-grade data to create GIS based data that can be accessed by all land users. Blackfeet Tribal Transportation has already initiated this effort through its creation of a web-based road mapping system and is working with other tribal entities and the State Library to expand this platform.

In 2013, 2015, and 2017, the Tribe received the ACEC Engineering Excellence Honor Awards for its work on the development of Low Distortion Projections, publication of the Tribal Mapping Handbook and User Guide and implementation of CORS.

2. **Previous CORS Installation** - In 2016, the Blackfeet Tribe, in conjunction with the Rocky Mountain Indian Tribes received an Accelerated Innovation Deployment (AID) Grant to

Fiscal Year 2019 Montana Land Information Act Grant Application

Blackfeet Reservation, Montana

purchase CORS stations for various locations throughout the reservation. Since receiving the grant, the Tribe partnered with the Montana Department of Transportation to utilize their existing facilities' internet, electricity, and secure sites. The Tribe further leveraged the project through their partnership with the Blackfeet Housing Department to utilize tribal labor and equipment to install a "pilot" CORS in Browning. The remaining CORS will be installed in summer 2018, after MDT contractor procurement is complete.

Specialized survey services, including on-the-ground CORS setup, calibration, and accuracy verification will be provided by the Tribe's engineering consultant, Northern Engineering and Consulting, Inc. (NECI). NECI has been providing engineering and survey services to the Tribe since 1999 and was selected through the Qualification Based Selection process. NECI provided the specialized survey services for the installation of several CORS in the Rocky Mountain region.

The Tribe supports the Montana Library's mission to support publicly accessible data and is establishing a GIS based mapping system accessible throughout the Tribe as a web-based mapping application. To further support the MLIA mission, the Tribe will provide the subsequent PLSS and infrastructure to the Montana State Library and agrees to comply with data submission requirements.

Since the CORS and Tribal mapping project is a part of the Blackfeet Transportation Improvement Program, the Tribe already routinely prepares and submits quarterly financial and progress reports to comply with federal reporting requirements. The Tribe is prepared to modify the reports to fit State reporting requirements.

Blackfeet Reservation, Montana

SECTION 5 – SCOPE OF WORK

1. Goals and Objectives – The goal of the Heart Butte CORS Project is to establish permanent, georeferenced survey control for enhanced data collection on the Blackfeet Reservation through the establishment of a Continuously Operating Reference Station. The goal of enhanced survey control will be accomplished through the purchase, installation, and initiation of a Continuously Operating Reference Station in Heart Butte, Montana on the Blackfeet Indian Reservation. Further objectives include collection of PLSS data through a partnership with the Blackfeet Community College or interns upon CORS station installation and establishment of a Real Time Network (RTN) for the Blackfeet Reservation.

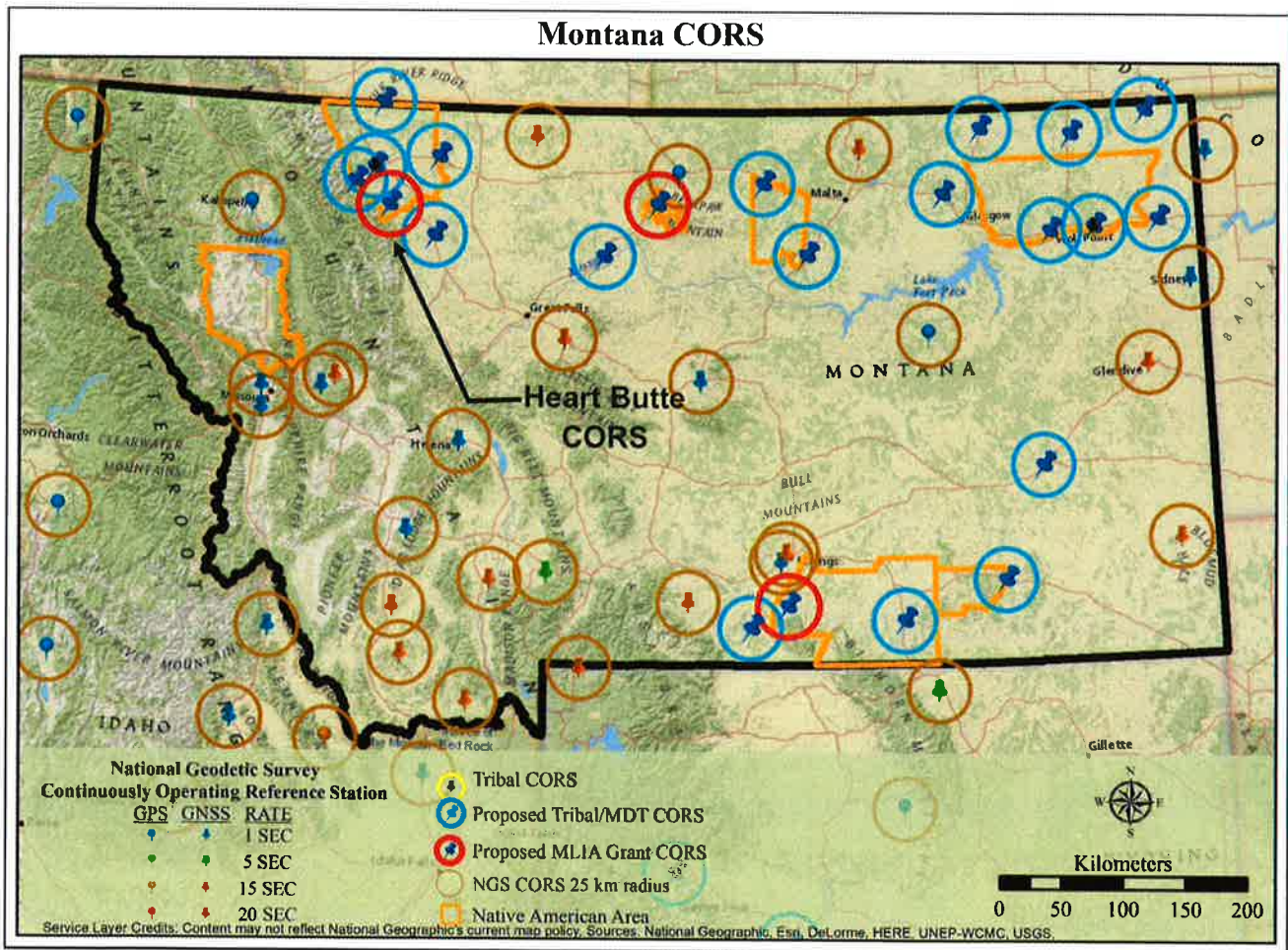


Figure 2 - Proposed and existing CORS coverage throughout Montana.

Blackfeet Reservation, Montana

2. Tasks or Activities – The following activities constitute the tasks required to install the Heart Butte CORS upon developing the Statement of Work and receipt of funding on July 1, 2018:
- a. **Scoping and Planning with Vendor and Technical Experts** – The vendor and consulting technical experts will first be consulted to determine the feasibility, most suitable location, and mounting procedure of installing a CORS station on Heart Butte School. Following the initial planning efforts, the Vendor and Consultant will develop conceptual drawings showing mounting materials and methods, internet and electricity wiring and routing, hardware mounting requirements, and internet modifications. This task is estimated to take 9 weeks.
 - b. **Procurement of CORS and Installation Materials** – Following project planning, the Tribe will purchase the CORS hardware and the mounting system from the Vendor. The Vendor will be selected through a formal proposal process in accordance with the Tribe's procurement policy. At this time the project manager will begin coordination with Blackfeet Housing and the Heart Butte School to schedule mobilization and construction. It is estimated that materials can be purchased and delivered to the Tribe within 12 weeks of order placement.
 - c. **CORS Installation** – Upon CORS delivery, Blackfeet Housing will mobilize to Heart Butte to mount the system, install grounding and a polyphase box, setup the receiver, establish the IP address through 3 Rivers Communications, complete all internet connections and wiring, and set-up broadcast signals. Tribal surveyors, through the support of the consultant will then conduct verification surveys at known reference points and conduct the calibration process. It is anticipated that this task will require three days, but three weeks has been provided in the project schedule in case additional mounting equipment is required.
 - d. **Data Collection and RTN Establishment** – After the CORS is installed the Tribe can begin efficient georeferenced data collection in the Heart Butte area on the southern part of the Blackfeet reservation, including surveying of PLSS section corners for submission to the Montana State Library to improve MSDI parcel mapping. Infrastructure, including potable water, sanitary sewer, transportation, irrigation is also needed in the Heart Butte area. The Tribal Transportation Department will partner with the Blackfeet Community College to enlist the help of classes and interns to increase tribal capacity and enhancement community education efforts.

Blackfoot Reservation, Montana

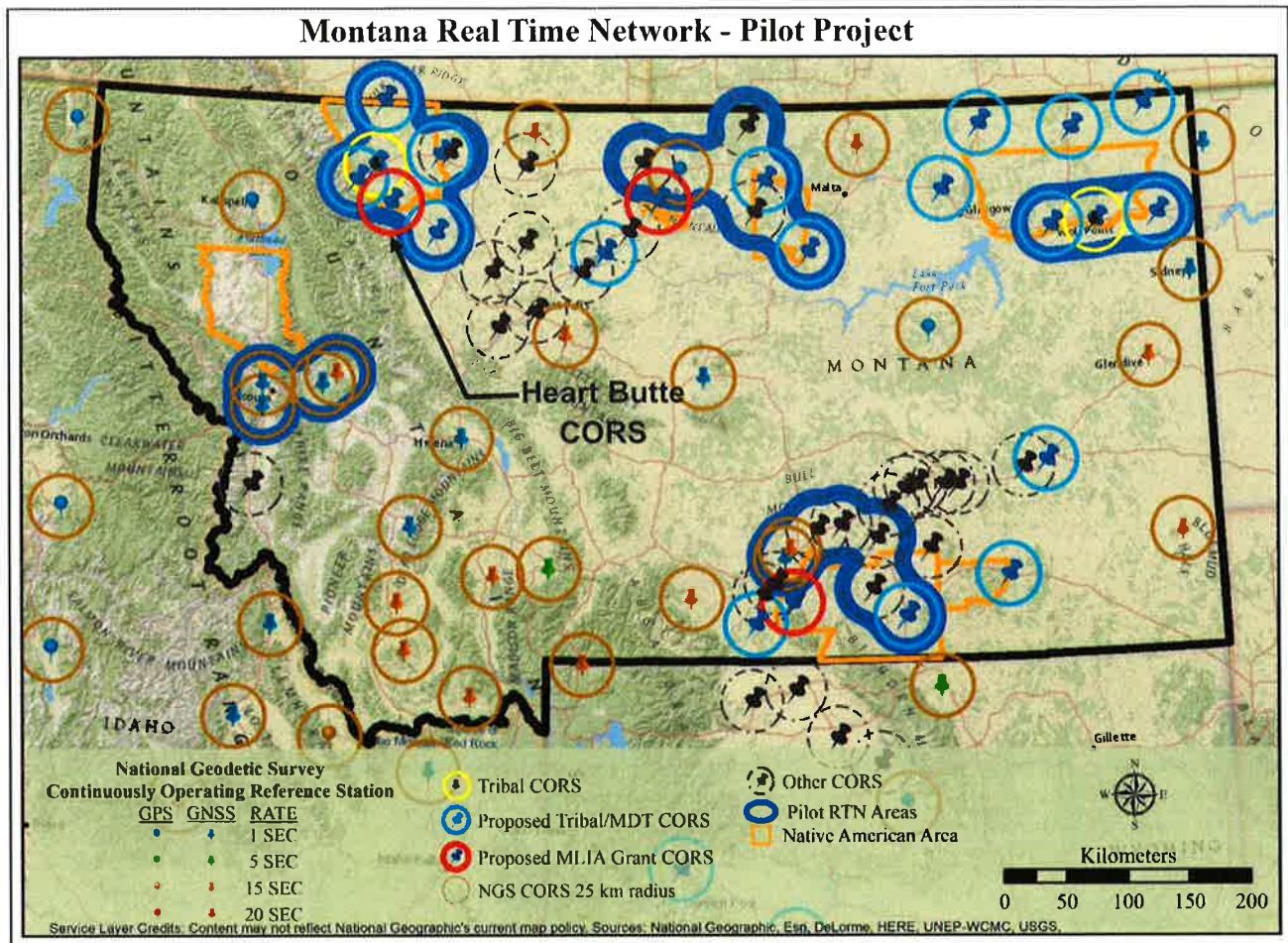


Figure 3 - RTN Pilot Project coverage throughout Montana.

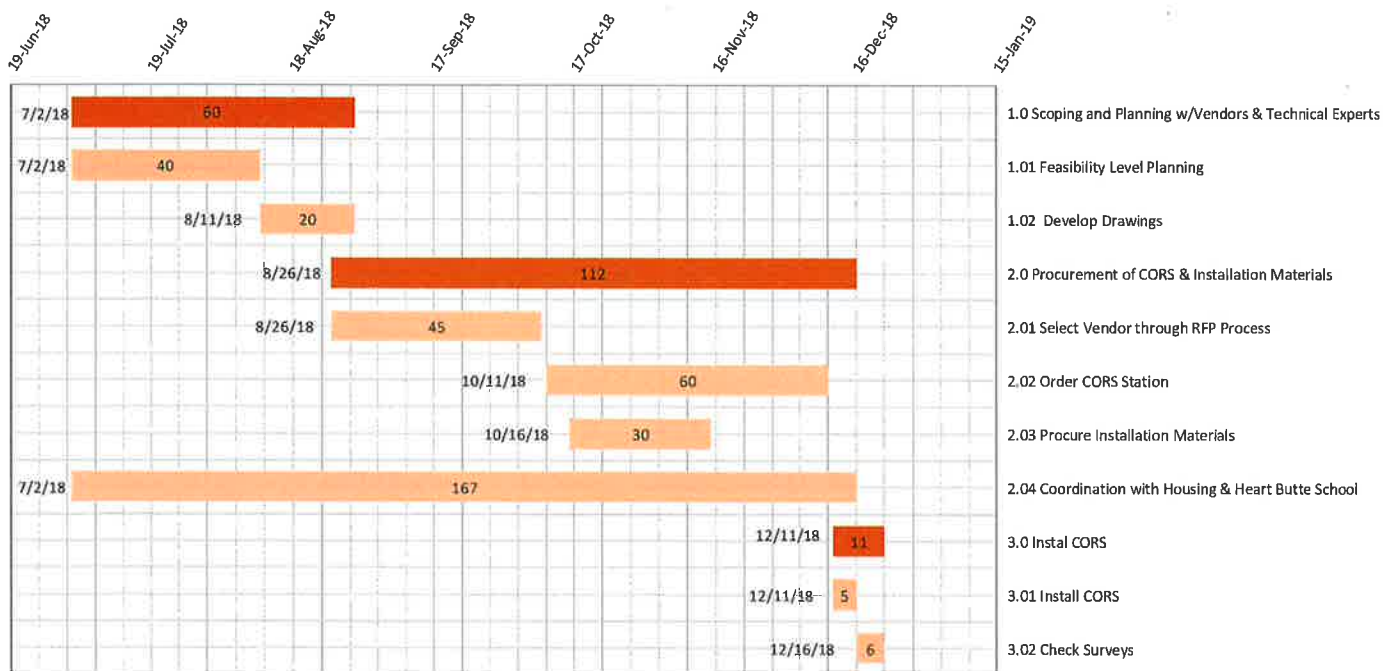
Although the Heart Butte CORS will not be an NGS accepted station due to spacing requirements, the CORS is still needed to densify CORS spacing to implement a Real Time Network (RTN), which will provide improved station accessibility and access to machine controlled construction equipment and GPS farm enabled equipment. Although not part of this project, the RTN is expected to be implemented in 2019. To accomplish this, the Tribe expects to apply for another Accelerated Innovated Deployment Grant from FHWA. The Tribe, with MARLS and MDT are already working with the State of Washington, who is doing an RTN Pilot Project for Montana.

Fiscal Year 2019 Montana Land Information Act Grant Application

Blackfeet Reservation, Montana

3. **Project Schedule** – The project tasks listed in the above section will be accomplished as follows:

Task	Start	End	Duration
1.0 Scoping and Planning w/Vendors & Technical Experts	2-Jul-2018	31-Aug-2018	60
1.01 Feasibility Level Planning	2-Jul-2018	11-Aug-2018	40
1.02 Develop Drawings	11-Aug-2018	31-Aug-2018	20
2.0 Procurement of CORS & Installation Materials	26-Aug-2018	16-Dec-2018	112
2.01 Select Vendor through RFP Process	26-Aug-2018	10-Oct-2018	45
2.02 Order CORS Station	11-Oct-2018	10-Dec-2018	60
2.03 Procure Installation Materials	16-Oct-2018	15-Nov-2018	30
2.04 Coordination with Housing & Heart Butte School	2-Jul-2018	16-Dec-2018	167
3.0 Instal CORS	11-Dec-2018	22-Dec-2018	11
3.01 Install CORS	11-Dec-2018	16-Dec-2018	5
3.02 Check Surveys	16-Dec-2018	22-Dec-2018	6
4.0 Data Collection & RTN Establishment - Future	2-Jan-2019	2-Jan-2020	
4.01 PLSS & Infrastrue Data Collection	2-Jan-2019	Ongoing	
4.02 Establish RTN	2-Jan-2019	2-Jan-2020	



Blackfeet Reservation, Montana

SECTION 6 – BUDGET JUSTIFICATION AND BUDGET TABLE

Project expenditures to install CORS were evaluated extensively to prepare costs to support the Montana Department of Transportation (MDT) in installing the NGS CORS, to prepare the 2015 Accelerated Innovation Deployment (AID) grant application, and to construction the Browning CORS. The project budget is as follows:

1. **Permanent Materials** – Material costs were determined through vendor quotes obtained in conjunction with the MDT CORS project. Necessary permanent materials to be funded by the MLIA grant are as follows:

CORS Hardware	\$15,000.00
220' LMR600 cable	\$660.00
Polyphaser - GPS (N connectors)	\$170.00
N-connectors GPS x2	\$38.50
#6 CU ground wire (10 feet)	\$13.75
25' (1.5" conduit & 2 sweep 90's and misc.)	\$11.00
Wall Mount	\$1,650.00
Tech 200 (shipping)	\$55.00
Seco 2072-33 tilt mount	\$253.00
Ground Rod	\$55.00
Anchor Bolts	\$27.50
Misc. (shelf supports, epoxy, conduit, emt conduit, etc)	\$132.00
Total	\$18,065.75

2. **Labor and Equipment** – Labor and material costs were determined based on actual installation costs of the Browning CORS. Labor and equipment, to be contributed by Blackfeet Housing and the Blackfeet Tribal Transportation (in-kind), are as follows:

	Cost/Hour	Hours	Total Cost
Blackfeet Housing Expenses			
Man Lift	\$28.13	24	\$675.12
Man Lift Operator	\$33.92	24	\$814.08
Subtotal			\$1,489.20
Blackfeet Tribal Transportation Program Expenses			
Survey Crew	\$165.00	24	\$3,960.00
Professional Land Surveyor	\$116.00	20	\$2,320.00
Technician	\$73.00	5	\$365.00
Travel and Milage			\$1,609.00
Subtotal			\$8,254.00
Total			\$9,743.20

Fiscal Year 2019 Montana Land Information Act Grant Application

Blackfeet Reservation, Montana

3. **Operations & Maintenance** – Although CORS need no manual day-to-day operations, it is assumed that data management, periodic restarts, updates, and reprogramming of the CORS will be needed. Maintenance will be performed by the Blackfeet Tribal Transportation Program yearly funding shares with support as necessary from the Vendor. The following summarizes yearly costs to service, maintain, and provide internet and electricity to the CORS:

	Estimated Cost Per Year
Heart Butte School or Equivalent	
Internet	\$480.00
Electricity	\$240.00
Blackfeet Tribal Transportation Program	
Maintance	\$580.00
Total	\$1,300.00

STATEMENTS OF SUPPORT (IF APPLICABLE)

A statement of support has been provided by Blackfeet Housing, attached to this application.

Fiscal Year 2019 Montana Land Information Act Grant Application

Blackfeet Reservation, Montana

MLIA GRANT BUDGET SUMMARY TABLE

MLIA GRANT BUDGET SUMMARY							
	MLIA Summary	Applicant Summary			Funding Partner Summary*		Total:
Category	MLIA Share	Applicant Cash	Applicant In-kind	Applicant Subtotal	Blackfeet Housing	Partner Subtotal	MLIA Share, Applicant Subtotal, Partner Subtotal
a. Personnel			\$1,980	\$1,980	\$814	\$814	\$2,794
a. 1. Fringe Benefits							
b. Travel			\$531	\$531			\$531
c. Equipment	\$15,000				\$675	\$675	\$15,675
d. Supplies & Materials	\$3,066						\$3,066
e. Contractual			\$5,743	\$5,743			\$5,743
f. Other							
Total	\$18,066		\$8,254	\$8,254	\$1,489	\$1,489	\$27,809

SECTION 7 – RENEWABLE GRANT ACCOUNTABILITY

SECTION 8 – AUTHORIZING STATEMENT

Authorizing Statement

I hereby certify that I have read the application and the information and all statements in this application are true, complete and accurate to the best of my knowledge and that the project or activity complies with all applicable state, local and federal laws and regulations.

I further certify that this project will comply with applicable statutory and regulatory standards.

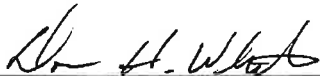
I further certify that I am (by my signature) authorized to enter into a binding agreement with the Montana State Library to obtain a grant if this application receives approval.

DON WHITE

Name (print or type)

TRANSPORTATION PLANNER

Title (print or type)



Signature and Title of Authorized Representative(s) of Public Entity Applicant

2-14-2018

Date

SECTION 9 – CHECKLIST – SIGNATURES REQUIRED

Applicant's Project Manager, defined Section 1, must initial in ink or mark 'n/a' if a section is not applicable.

Initial or mark n/a	Completed Required Task
D.W	Proposal Prepared by an outside party – I have read this document in its entirety. (if applicable)
D.W	Section 1 – Applicant, Partner, and Proposal Information
D.W	Primary Applicant Information
D.W	Funding Partner (if applicable)
D.W	Proposal Information
N/A	List All Past Awarded MLIA Grants
D.W	Section 2 – Relevance (300 max word limit)
D.W	Section 3 – Public Benefit
D.W	Section 4 – Project Management
D.W	Section 5 – Scope of Work Narrative (4-page limit)
D.W	Section 6 – Budget Justification Narrative and Table (3-page limit)
D.W	Budget Justification Narrative
D.W	Complete Budget Table
D.W	Section 7 – Funding Partner Statements of Support (if applicable)
N/A	Section 8 – Renewable Grant Accountability Narrative (if applicable)
N/A	FY2018 Grantee Report (if applicable)
N/A	Past MLIA Grant Project Narrative (if applicable)
D.W	Section 9 – A Signed Authorizing Statement



BLACKFEET HOUSING

P.O. BOX 449 BROWNING, MONTANA 59417
PHONE (406) 338-5031 FAX (406) 338-5731

February 14, 2018

To: Don White, Director of the Blackfeet Tribal Transportation Program
Subject: Montana Library Information Advisory Council Grant Proposal

Greetings,

The Blackfeet Housing Program is committed to supporting the Heart Butte CORS Project by aiding the Blackfeet Tribal Transportation Program in the installation of the purposed Continuously Operating Reference Station.

The Browning CORS, the installation of which we assisted in, has proven to be a great asset to our program -allowing us to hire our own survey technician. His work efficiency would not be what it is without the time saving infrastructure the Browning CORS provides him. With the completion of the Heart Butte CORS, Blackfeet Housing's ability to complete construction projects with the same efficiency will carry over to the Heart Butte community and the surrounding area.

The Blackfeet Housing Department recognizes this as an important opportunity to build tribal and state partnerships, to develop state infrastructure for the benefit of the public and the tribe. Please contact me at (406) 338-5031 or chancy@blackfeethousing.org to further review or discuss the project.

Sincerely,

Chancy Kittson, Executive Director
Blackfeet Housing
P.O. Box 449
1200 SW Boundary Street
Browning, MT 59714